The Future of Port Solutions

Building on a strong tradition
Terex milestones in port business

1824

1906

1933

1960

1966

1968

Launch of Straddle Carrier

Launch of Lift Trucks

Invention of Mobile Harbor Cranes

PPM, Fantuzzi, Reggiane, Noell, Demag Cranes and Gottwald are legacy brands of Terex® Corporation
Manufacturing locations

Europe

- Düsseldorf
- Würzburg
- Montceau-les-Mines *
- Lentigione

China

- Xiamen

* Terex Cranes France SAS is part of the Terex Cranes Business Segment, but also manufactures Reach Stackers for port applications.
Manufacturing locations

**Europe**

- **Montceau-les-Mines**, France*
  - Production: Reach Stackers
  - Total area: 38,800 m²

- **Würzburg**, Germany
  - Production: Harbour Cranes, Automated Stacking Cranes, Automated Guided Vehicle
  - Total area: 160,000 m²

- **Düsseldorf**, Germany
  - Production: Straddle Carrier, Sprinter Carrier
  - Total area: 90,000 m²

- **Lentigione**, Italy
  - Production: Full Container Handlers, Empty Container Handlers, Fork Lifts
  - Total area: 150,000 m²

* Terex Cranes France SAS is part of the Terex Cranes Business Segment, but also manufactures Reach Stackers for port applications.
Manufacturing locations

Xiamen, P.R. China

- Production
  - Ship-to-Shore Cranes
  - Rubber-Tyred Gantry Cranes
  - Rail-Mounted Gantry Cranes
  - Reach Stackers
  - Empty Container Handlers
- Total area 280,000 m²
Product and service portfolio

**Loading & unloading**
- Ship-to-Shore Cranes (STS)
- Harbor Cranes
  - Mobile Harbor Cranes (G HMK)
  - Portal Harbor Cranes (G HSK)
  - Floating Cranes (G HPK)
  - Pedestal-Mounted Harbor Cranes (G HPK)
  - Rubber-Tired Portal Harbor Cranes (G HRK)

**Transport**
- Straddle Carriers (SC)
- Sprinter Carriers
- Automated Guided Vehicles (AGV)

**Storage**
- Automated Stacking Cranes (ASC)
- Rubber-Tired Gantry Cranes (RTG)
- Rail-Mounted Gantry Cranes (RMG)

**Handling**
- Reach Stackers (RS)
- Empty Container Handlers (ECH)
- Full Container Handlers (FCH)
- Fork Lifts
- Hoppers

**System capabilities**
- Planning & consulting
- Software
- Service
Loading & unloading
- Ship-to-Shore Cranes (STS)
- Harbor Cranes
  - Mobile Harbor Cranes (G HMK)
  - Portal Harbor Cranes (G HSK)
  - Floating Cranes (G HPK)
  - Pedestal-Mounted Harbor Cranes (G HPK)
  - Rubber-Tyred Portal Harbor Cranes (G HRK)

Storage
- Automated Stacking Cranes (ASC)
- Rubber-Tired Gantry Cranes (RTG)
- Rail-Mounted Gantry Cranes (RMG)

Transport
- Straddle Carriers (SC)
- Sprinter Carriers
- Automated Guided Vehicles (AGV)

System capabilities
- Planning & consulting
- Software
- Service

Handling
- Reach Stackers (RS)
- Empty Container Handlers (ECH)
- Full Container Handlers (FCH)
- Fork Lifts
- Hoppers
Ship-to-Shore Cranes (STS)

- High capacity container handling
- Operation alongside various vessel sizes up to super post-Panamax
- Manufacturing location - Xiamen, China
Ship-to-Shore Cranes (STS)

- **Capacities**
  - Handling 20’ to 45’ containers
  - Lifting capacities (under spreader)
    - Up to 65 t, single/twin
    - Up to 120 t, tandem

- **Dimensions**
  - Rail span up to 35 m
  - Outreach up to 66 m
  - Lifting height up to 46 m (from dock level)

- **Speeds**
  - Gantry travel 45 m/min (standard)
  - Trolley travel up to 244 m/min
  - Hoisting with load up to 90 m/min

- **Design**
  - Trolley: rope towed or self-propelled
  - Power supply: port mains or on-board diesel generator
Harbor Cranes

- Loading & unloading of containers, general, bulk and project cargoes
- Broad range of crane sizes, types and variants
- All crane types based on proven mobile harbor crane technology
- Mobile throughout a port – flexible place of operation
- Low specific investment in equipment and infrastructure
- Manufacturing location: - Düsseldorf, Germany
Harbor Cranes

- Capacities
  - Lifting capacities up to 200 t
  - Radii up to 58 m
  - Dedicated 4-rope grab cranes, handling rates up to 1,850 tph

- Drive system
  - Diesel-electric
  - Prepared for external power supply
  - Optional hybrid drive
Harbor crane range

Container vessel size

- Small Crane Family
  - Model 2
  - Model 3
  - Model 4
  - Model 5

- Medium-Sized Crane Family
  - Model 6
  - Model 7
  - Model 8

- Large Crane Family

Bulk vessel size

- Barge/Coaster
  - Rows ≤ 6
- Feeder
  - Rows ≤ 8
- Standard
  - Rows ≤ 10
- Panamax
  - Rows ≤ 13
- Post-Panamax
  - Rows ≤ 17
- Super Post-Panamax
  - Rows ≤ 18

- DWT ≤ 5,000
- ≤ 30,000
- ≤ 50,000
- ≤ 80,000
- ≤ 170,000

Model

- Model 2
- Model 3
- Model 4
- Model 5
- Model 6
- Model 7
- Model 8
Modular design of Harbor Cranes

Quayside cranes
- G HPK Pedestal-Mounted Harbour Crane
- G HSK Rail-Bound Portal Harbour Crane
- G HRK Rubber-Tired Portal Harbour Crane
- G HMK Mobile Harbor Crane

Medium-Sized Crane Family
- Models 3, 4 and 5

Large Crane Family
- Models 6, 7 and 8

Floating cranes
- G HPK Floating Crane

New type for Model 2

Chassis length and no. of axles depends on crane model
Harbor crane types

Mobile Harbor Cranes
- Extremely versatile
- High performance
- Short lead times achieved by Advance Order Programme
- Low specific investment in crane and infrastructure thanks to modular design

Portal Harbor Cranes
- For narrow and special purpose quays
- Individually designed portal
  - Clearance height: 4 - 10 m
  - Track gauge: 10 - 20 m

Floating Cranes
- Turnkey solution from barge to crane
- No additional investment in land or quay infrastructure
- Ship-to-ship or ship-to-shore handling
- Operation on quayside, mid-stream or on the open sea

Rubber-Tired Portal Harbor Cranes
- Combines mobility of a mobile harbor crane with the advantage of a portal solution
- Easy to drive under
- Easily manoeuvrable
Product and service portfolio

**Loading & unloading**
- Ship-to-Shore Cranes (STS)
- Harbor Cranes
  - Mobile Harbor Cranes (G HMK)
  - Portal Harbor Cranes (G HSK)
  - Floating Cranes (G HPK)
  - Pedestal-Mounted Harbor Cranes (G HPK)
  - Rubber-Tired Portal Harbor Cranes (G HRK)

**Transport**
- Straddle Carriers (SC)
- Sprinter Carriers
- Automated Guided Vehicles (AGV)

**Storage**
- Automated Stacking Cranes (ASC)
- Rubber-Tired Gantry Cranes (RTG)
- Rail-Mounted Gantry Cranes (RMG)

**Handling**
- Reach Stackers (RS)
- Empty Container Handlers (ECH)
- Full Container Handlers (FCH)
- Fork Lifting
- Hoppers

**System capabilities**
- Planning & consulting
- Software
- Service
Straddle Carriers (SC)

- Picking, carrying and stacking containers
- Ability to transfer, lift and stack
- Hydrostatic or diesel-electric drive
- Optional EcoCap energy saving system
- Manufacturing location
  - Würzburg, Germany
Straddle Carriers (SC)

- **Capacities**
  - Handling 20’ to 45’ containers
  - Lift capacity (under spreader) up to 60 t

- **Dimensions**
  - Width approx. 5 m
  - Length approx. 10 m
  - Lifting height up to 12 m (3+1)

- **Speeds**
  - Travel up to 30 kph
  - Hoisting up to 24 m/min

- **Features / options**
  - Single or twinlift
  - Automatic spreader positioning system
  - Weighing system
  - Tyre pressure / oil condition monitoring
  - Others
Sprinter Carriers

- Picking and carrying containers
- Ability both to transfer and lift
- Hydrostatic or diesel-electric drive
- Manufacturing location
  - Würzburg, Germany
Sprinter Carriers

- Capacities
  - Handling 20’ to 45’ containers
  - Lift capacity (under spreader) up to 60 t

- Dimensions
  - Width approx. 5 m
  - Length approx. 10 m
  - Lifting height up to 6.2 m (1+1)

- Speeds
  - Travel up to 32 kph
  - Hoisting up to 24 m/min

- Features / options
  - Single or twinlift
  - Automatic spreader positioning system
  - Weighing system
  - Tyre pressure / oil condition monitoring
  - Others
AGV Automated Guided Vehicles

- Horizontal container transport
- Fully automated; fleet management and navigation software
- Lift AGV version; decouples transport from storage and thus reduces fleet size
- Manufacturing location:
  - Düsseldorf, Germany
AGV Automated Guided Vehicles

- Handling 20’ to 45’ containers
- Capacity 40/60 t (1 container/2 x 20’ containers)
- Speed up to 22 kph (6 m/s)
- Positioning accuracy +/- 25 mm
- Drive systems
  - Diesel-electric
  - Battery drive
- Battery drive system
  - Zero emissions
  - Fully automated battery change station
Product and service portfolio

Loading & unloading
- Ship-to-Shore Cranes (STS)
- Harbor Cranes
  - Mobile Harbor Cranes (G HMK)
  - Portal Harbor Cranes (G HSK)
  - Floating Cranes (G HPK)
  - Pedestal-Mounted Harbor Cranes (G HPK)
  - Rubber-Tired Portal Harbor Cranes (G HRK)

Storage
- Automated Stacking Cranes (ASC)
- Rubber-Tired Gantry Cranes (RTG)
- Rail-Mounted Gantry Cranes (RMG)

Transport
- Straddle Carriers (SC)
- Sprinter Carriers
- Automated Guided Vehicles (AGV)

System capabilities
- Planning & consulting
- Software
- Service

Handling
- Reach-Stackers (RS)
- Empty Container Handlers (ECH)
- Full Container Handlers (FCH)
- Fork Lifts
- Hoppers
ASC Automated Stacking Cranes

- Accurate container stacking with very high storage density
- High-rigidity construction
- Fully automated; crane and stack management software
- Manufacturing location: - Düsseldorf, Germany
ASC Automated Stacking Cranes

- Capacities
  - Handling 20’ to 45’ containers
  - Lifting capacity (under spreader) 40 t

- Dimensions
  - Working span 8 to 12 containers
  - Typical stack length 35 - 50 TEUs
  - Working height up to 5+1 (high-cube)

- Speeds
  - Gantry travel 240 m/min
  - Trolley travel 60 m/min
  - Hoisting 39/72 m/min (full/empty)

- Design
  - Rigid load guidance system; provides high positioning accuracy even in severe conditions
  - Cantilever version available
Rubber-Tired Gantry Cranes (RTG)

- Space-saving container stacking
- Mobile for flexible use
- Manufacturing location
  - Xiamen, China
Rubber-Tired Gantry Cranes (RTG)

- **Capacities**
  - Handling 20’ to 45’ containers
  - Lift capacity (under spreader) up to 60 t, single/twinlift

- **Dimensions**
  - Span up to 26.5 m, 7+1 truck line
  - Lifting height (under heavy lift beam) up to 21 m, 6+1 high cube box

- **Speeds**
  - Gantry travel 135 m/min
  - Trolley travel up to 75 m/min
  - Hoisting with load up to 30 m/min

- **Design**
  - Fully electric drive; energy-saving system available
  - Power supply: port mains or on-board diesel generator
Rail-Mounted Gantry Cranes (RMG)

- Space-saving container stacking
- High performance, high span
- Manufacturing location:
  - Xiamen, China
Rail-Mounted Gantry Cranes (RMG)

- **Capacities**
  - Handling 20’ to 45’ containers
  - Lift capacity (under spreader) up to 60 t, single/twinlift

- **Dimensions**
  - Rail span up to 50 m
  - Lifting height (under heavy lift beam) up to 34 m

- **Speeds**
  - Gantry travel 120 m/min
  - Trolley travel up to 100 m/min
  - Hoisting with load up to 40 m/min

- **Design**
  - Automatic positioning system
  - Weighing system available
Product and service portfolio

Loading & unloading
- Ship-to-Shore Cranes (STS)
- Harbor Cranes
  - Mobile Harbor Cranes (G HMK)
  - Portal Harbor Cranes (G HSK)
  - Floating Cranes (G HPK)
  - Pedestal-Mounted Harbor Cranes (G HPK)
  - Rubber-Tired Portal Harbor Cranes (G HRK)

Transport
- Straddle Carriers (SC)
- Sprinter Carriers
- Automated Guided Vehicles (AGV)

Storage
- Automated Stacking Cranes (ASC)
- Rubber-Tired Gantry Cranes (RTG)
- Rail-Mounted Gantry Cranes (RMG)

Handling
- Reach Stackers (RS)
- Empty Container Handlers (ECH)
- Full Container Handlers (FCH)
- Fork Lifts
- Hoppers

System capabilities
- Planning & consulting
- Software
- Service
Reach Stackers (RS)

- Handling and stacking of containers
- Dedicated multi-attachment versions for other cargo also available
- Manufacturing locations:
  - Montceau-les-Mines, France
  - Xiamen, China
Reach Stackers (RS)

- Handling 20’ to 45’ containers
- Capacities up to 70 t
- Stacking height up to 5+1
- Intermodal/piggyback spreader available for all models
Empty Container Handlers (ECH)

- Handling and stacking of empty containers
- Handling 20’ to 45’ containers
- Stacking height up to 7+1
- Single or double container handling mode
- Capacity under spreader up to 10 t
- Available with spreaders or forks
- Manufacturing location:
  - Lentigione, Italy
  - Xiamen, China
Full Container Handlers (FCH)

- Handling and stacking of full containers
- Handling 20’ to 45’ containers
- Heavy-duty, extreme stacking operations
- Stacking height up to 5+1
- Capacity under spreader up to 45 t
- Available with spreaders or forks
- Manufacturing location:
  - Lentigione, Italy
Fork Lifts

- Containers or other heavy load handling (e.g. steel bars, coils, prefabricated concrete)
- Capacity up to 52 t
- Standard lifting height up to 5.1 m
- Other attachments available to handle a variety of cargo (ram, clamps, magnets)
- Manufacturing location:
  - Lentigione, Italy
  - Xiamen, China
Hoppers

- Handling of various dry bulk materials
- Flexible unloading concepts upon
  - Trucks
  - Trains
  - Conveyors
- Different designs
  - Mobile on wheels
  - On rails
  - Permanently installed
Hoppers

- Capacities up to 2,000 tph
- Highly efficient dust suppression systems available, e.g.
  - Wind protection
  - Flex-flap barrier
  - Wetting
  - Air curtain, automatically controlled
  - High-power extraction system
  - Retractable loading chutes
- Tailored to individual requirements
Loading & unloading
- Ship-to-Shore Cranes (STS)
- Harbor Cranes
  - Mobile Harbor Cranes (G HMK)
  - Portal Harbor Cranes (G HSK)
  - Floating Cranes (G HPK)
  - Pedestal-Mounted Harbor Cranes (G HPK)
  - Rubber-Tired Portal Harbor Cranes (G HRK)

Transport
- Straddle Carriers (SC)
- Sprinter Carriers
- Automated Guided Vehicles (AGV)

System capabilities
- Planning & consulting
- Software
- Service

Storage
- Automated Stacking Cranes (ASC)
- Rubber-Tired Gantry Cranes (RTG)
- Rail-Mounted Gantry Cranes (RMG)

Handling
- Reach Stackers (RS)
- Empty Container Handlers (ECH)
- Full Container Handlers (FCH)
- Fork Lifts
- Hoppers
Planning & consulting

- Project management from concept to startup
- Simulation and emulation of terminals
Software & simulation

- Management and navigation software
- Bulk specific IT solutions
  - CommTrac terminal management system
  - Conveyor management software
- Further software packages for container and bulk terminals
- Software brands: TBA, DBIS
Always the right combination

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</table>

- **Application**:
  - Bulk
  - Containers
  - General Cargo
  - Project Cargo

- **Loading & unloading**:
  - Pedestal-mounted HC
  - Ship-to-Shore Crane
  - Portal Harbor Crane
  - Floating Crane

- **Transport**:
  - Lift AGV
  - Battery Lift AGV
  - Sprinter Carrier
  - Automated Guided Vehicle

- **Storage**:
  - Automated Stacking Crane
  - Rail-mounted Gantry

- **Handling**:
  - Reach Stacker
  - Full Container Handler
  - Fork Lift
  - Bulk Material Handler
Multi-purpose terminal

Application
- Bulk
- Containers
- General Cargo
- Project Cargo

Loading & unloading
- Pedestal-mounted HC
- Ship-to-Shore Crane
- Mobile Harbor Crane
- Portal Harbor Crane
- Floating Crane

Handling
- Full Container Handler
- Empty Container Handler
- Fork Lift
- Bulk Material Handler
- Hopper
## Bulk terminal

**Example**

### Application
- Project Cargo
- Containers
- General Cargo

### Loading & unloading
- Ship-to-Shore Cranes
- Mobile Harbor Crane
- Portal Harbor Crane
- Floating Crane
- Rubber-tired HSK

### Handling
- Fork Lift
- Bulk Material Handler
- Hopper
- Reach Stacker
- Full Container Handler
## Manual container terminal

### Application
- Bulk
- Containers
- General Cargo
- Project Cargo

### Loading & unloading
- Pedestal-mounted HC
- Ship-to-Shore Crane
- Mobile Harbor Crane
- Portal Harbor Crane
- Floating Crane

### Storage
- Automated Stacking Crane
- Rubber-Tired Gantry
- Rail-mounted Gantry

### Handling
- Bulk Material Handler
- Hopper
- Reach Stacker
- Full Container Handler
- Empty Container Handler
Semi-automated container terminal

Application
- Bulk
- General Cargo
- Project Cargo
- Containers

Loading & unloading
- Rubber-tyred HSK
- Pedestal-mounted HC
- Ship-to-Shore Crane
- Mobile Harbor Crane
- Portal Harbor Crane

Transport
- Battery Lift AGV
- Straddle Carrier
- Sprinter Carrier
- Automated Guided Vehicle
- Battery AGV

Storage
- Rail-mounted Gantry
- Automated Stacking Crane
- Rubber-tired Gantry

Photo: Gemeentelijk Havenbedrijf Antwerpen
## Fully automated container terminal

### Example

![Image of a container terminal with cranes and AGVs]

### Application
- **Containers**
  - Bulk
  - General Cargo
  - Project Cargo

### Loading & unloading
- Rubber-tyred HSK
- Pedestal-mounted HC
- Ship-to-Shore Crane
- Mobile Harbor Crane
- Portal Harbor Crane

### Transport
- Sprinter Carrier
- Automated Guided Vehicle
- Battery AGV
- Lift AGV
- Battery Lift AGV

### Storage
- Rail-mounted Gantry
- Automated Stacking Crane
- Rubber-tired Gantry
Responsibility

Terex Port Solutions provides

- Ergonomic solutions and user friendly control systems
- A comprehensive range of “green” products
- Highly efficient and environmentally compatible drive systems
- Space saving concepts
Do you have any questions? Feel free to ask